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A Guide to Adequate Nutrition and Hydration in Enteral Tube Feeding

Introduction

Enteral tube feeding (ETF) refers to the delivery of nutrition and hydration through a tube placed into the gastrointestinal tract (Dunn, 2015). The most common routes for tube feeding are naso-gastric, which is placed through the nose, oesophagus and into the stomach, gastrostomy, a tube directly placed through the abdominal wall into the stomach or surgical jejunostomy where the tube is placed in theatre through the abdominal wall directly into the jejunum (Pearce and Duncan, 2002). There are other options of feeding such as naso-jejunal or gastro-jejunal tube feeding but these are normally provided in circumstances where the other routes are not indicated. The selection of the route should be determined by patient condition, the multi-professional team and the patient and carers (Stroud et al, 2003). Recognition of the risk and ongoing management of each route should be considered including that of misplaced or displaced enteral feeding tubes and the guidance to support good practice in this area (NHS Improvement, 2016, NPSA, 2011, 2012). Enteral tube feeding can be provided on either a supplementary basis; where nutritional and fluid requirements can be titrated in accordance with oral or intravenous intake or full support where complete nutrition and hydration can be provided through the feeding tube. Enteral tube feeding supports a wide range of patients, including those with neurological and physical disabilities or those that are being prepared or recovered from surgery. It can be effective in the prevention or management of malnutrition and tackle the importance of good hydration through the normal physiological processes of the gut.

Assessment - Nutrition

The assessment of a patient's nutritional requirements should start much earlier than the initiation of enteral tube feeding. Ideally, this should begin with the nutritional screening of the patient as part of their initial assessment in the hospital or community setting. A validated nutritional screening tool such as MUST (NICE, 2006) should be used with the inclusion of actual rather than estimated weight. Nurses are in an ideal position to undertake this initial screen of the patients nutritional risk and collect information relating to dietary habits and intake. It is desirable to utilise a multi-professional approach when considering enteral tube feeding. This should involve a specialist dietitian, nutrition nurse, and doctor with expertise in nutritional support (BAPEN, 2007). Where dedicated nutrition teams exist they can benefit the patient experience and outcome by ensuring route, tube selection and ongoing management including monitoring and complication reduction is achieved (NICE, 2006, Schneider, 2006).

A specialist dietitian will assess and predict energy, protein and fluid requirements. Dietitians can utilise information relating to percentage weight loss, disease state, basal metabolic rate, age, gender, stress factors such as temperature, surgery or fluid losses and biochemical markers to inform their decision making process (Dunn, 2015). It is recognised in clinical practice on a day-to-day basis, the assessment of nutritional requirements is a predictive measure, which should be monitored and adjusted according to the patient clinical response. NICE (2006) recommend 25–35 kcal/kg body weight to be used to estimate total energy requirements but little information is given for complex patients that have multiple pathology. Weekes (2007) recognises the difficultly in the interpretation of estimating energy requirements and acknowledges the lack of robust evidence relating to many disease groups. In recognition, a specialist group of the British Dietetic Association (PENG, 2011) have

provided guidance to support dietitians in predictive estimation of nutritional requirements, but recognise that close monitoring must be a fundamental part of the evaluation process.

Assessment – Hydration

In combination with the delivery of nutrient requirements, the recognition of hydration on the effectiveness of treatment must be taken into consideration. Dehydration is well documented to impact on patient outcomes (Warren et al, 1994; Weinberg and Minaker, 1995; Stotts and Hopf, 2003, Rowat, 2012, Leach et al 2013) including the increased risk of infection, confusion, pneumonia, pressure ulcer formation and constipation. Therefore, adequate hydration is particularly important in the early stages of establishing enteral feeding. Patients will normally be commenced on a smaller percentage of their nutritional requirements in the early stages of establishing feeding. This can result in the volume of fluid being administered falling below the total daily volume via this route. It is therefore important to estimate as accurately as possible the overall fluid requirements utilising guidance from NICE (2006), PEN (2011) who recommend 30-35ml/kg/day.

Patients should have their fluid requirements recorded on a fluid balance chart that recognises fluid consumed from all routes including orally as well as enterally and the potential need to continue or supplement hydration intravenously in the interim period. The chart not only supports healthcare staff in observing overall intake but that of losses, such as urinary and gastrointestinal excretion and those patients who may have surgical drains or exudating wounds. A fluid balance record can assist in titrating all nutrition and hydration in accordance with patient input and output and acts as a valuable tool where used effectively. Johnstone et al (2015) support the need to closely monitor patients fluid requirements in recognition of Rowat et al (2012) where they found that over 62% of patients were dehydrated at some point during their hospital stay.

Ensuring successful delivery

Monitoring a patients nutritional and hydration requirements in the early stages can be a complex process and one that is most effectively undertaken with a specialist team approach (Stroud et al, 2003, Dunn, 2015). The team not only have to ensure they can feed the patient successfully but balance this with the fluid, medication and complex medical care the patient may require. Nutritional teams should always be aware of the potential risk of a patient developing refeeding syndrome on commencement of feeding (Crook, 2014). This is where the body exhibits a severe fluid and electrolyte shift resulting in an acute deficiency of potassium, magnesium and phosphate in the early to mid-stages of feeding (see box 2) (NICE, 2006, Mehanna et al, 2008). In instances where the team judge a patient to fall into the at risk category (see box 2), vitamins and minerals are administered alongside the feeding regime in accordance with NICE (2006) recommendations. Dietitians will work with the wider specialist multi-professional team to establish the best feed for the patient taking into account nutritional requirements, including energy and protein and any potential fluid restriction (Dunn, 2015).

Box 1: Patients at high risk of refeeding syndrome –

Criteria from the guidelines of the National Institute for Health and Clinical Excellence (NICE, 2006) for identifying patients at high risk of refeeding problems	Clinical features of refeeding syndrome
Body mass index (kg/m2) <16 Unintentional weight loss >15% in the past three to six months	Acute encephalopathy Acute tubular necrosis Anemia

Little or no nutritional intake for >10 days Low levels of potassium, phosphate, or magnesium before feeding Or the patient has two or more of the following: Body mass index <18.5 Unintentional weight loss >10% in the past three to six months Little or no nutritional intake for >5 days History of alcohol misuse or drugs, including insulin, chemotherapy, antacids, or diuretics	Ataxia Cardiac arrhythmias Central pontine myelinolysis Coma Congestive heart failure Constipation Delirium Diaphragm and intercostals and other muscle weakness Hyperglycemia Increased risk for infections Increased risk for renal impairment; acute or chronic kidney disease Korsakov's psychosis Liver failure or hepatic function tests abnormality Metabolic acidosis; lactic acidosis Myalgia or lassitude Osteomalacia Parasthesia Peripheral neuropathy Respiratory failure Rhabdomyolysis Sudden death Thrombocytopenia Ventilator dependency Vomiting or nausea Wernicke's encephalopathy

(Nice, 2006, Crook, 2014)

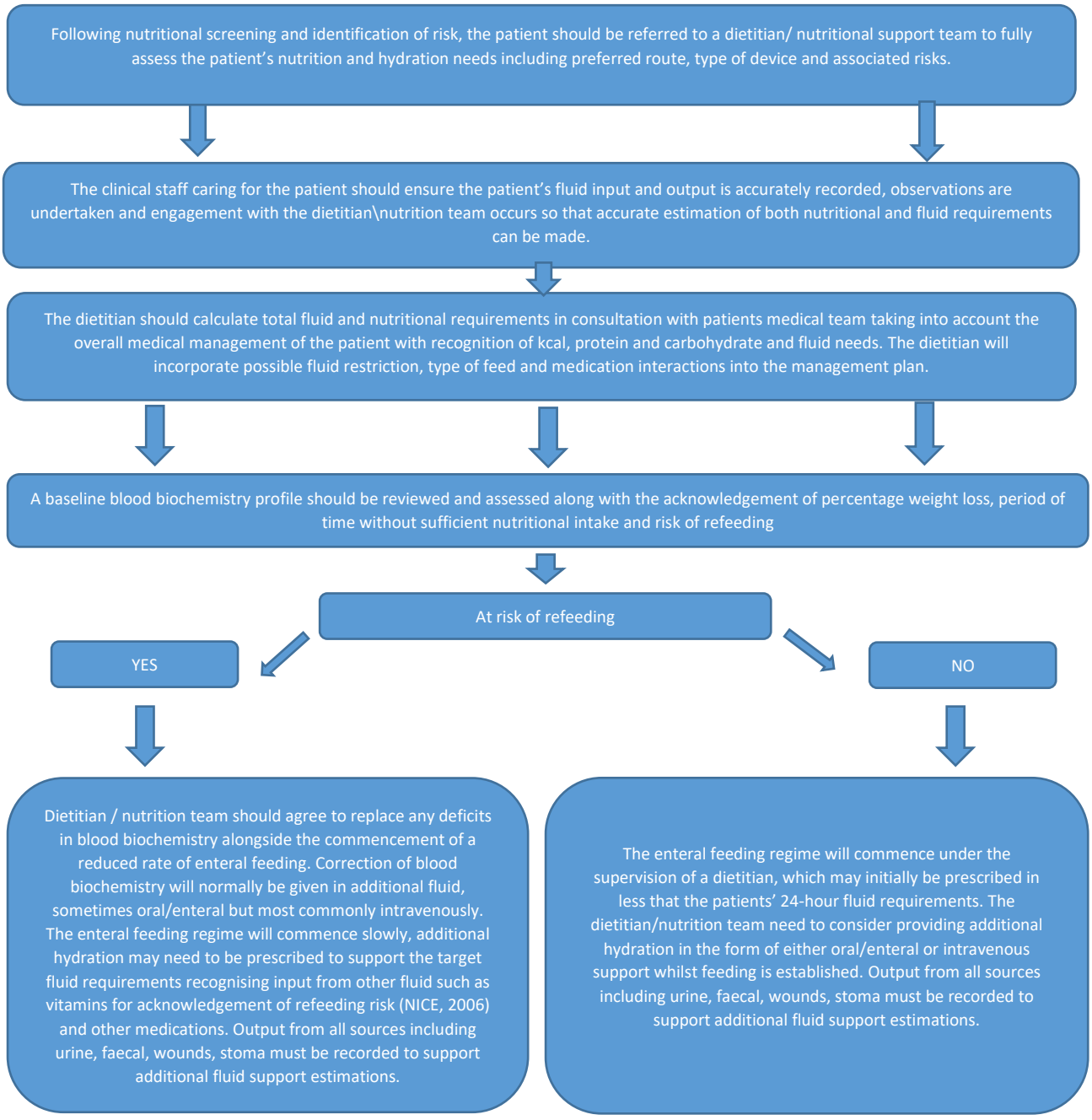
Where the risk of refeeding is identified the dietitian will reduce the volume and rate of feeding and more cautiously increase to move towards the target requirement (NICE, 2006). It is occasions like this that the patient fails to meet their full fluid requirements via the enteral feeding tube and supplementary oral or intravenous support may be required. The risk of medicine feed related interaction is a concern that should be taken seriously by the team. Medications that are required to treat the underlying medical treatment may require alteration where possible and this is where a team pharmacist can effectively contribute to the management plan for the patient (Best and Wilson, 2011, White and Bradham, 2015). The utilisation of resources available to support teams in the form of simple guides for the safe and effective management of medicines and enteral feeding should be available to support every patient in every clinical area (White & Brahdam, 2015). Once the assessment and management plan is developed, the effectiveness of feeding is reliant on anticipating and managing potential or actual problems that may occur (see box 2).

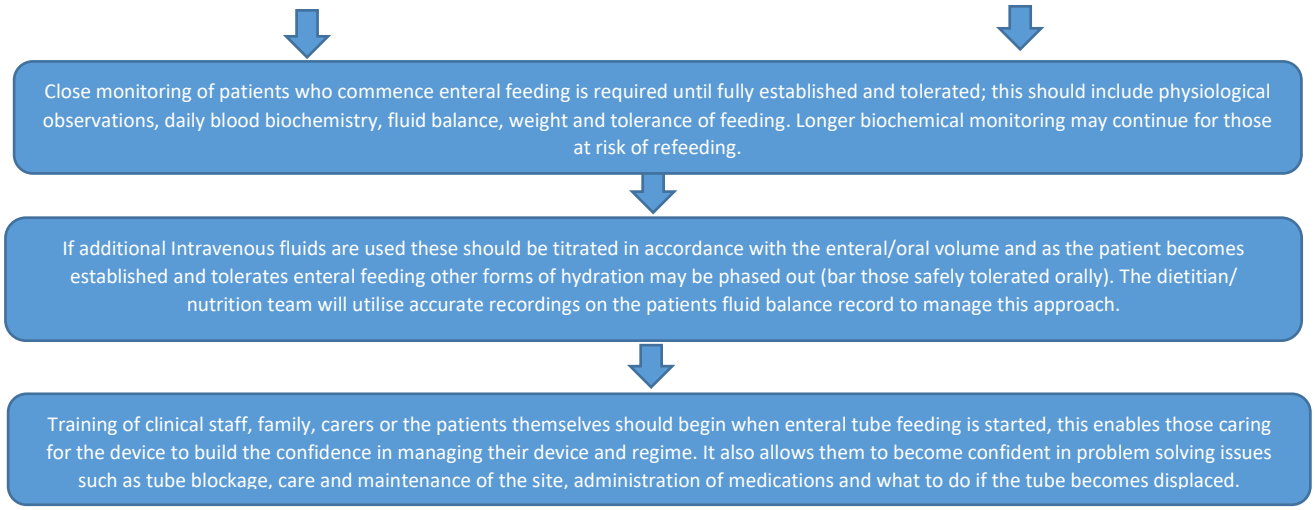
Box 2 – Common complications associated with enteral feeding

Diarrhoea Metabolic imbalance Nausea, Reflux, Tube blockage Tube displacement Vomiting

Therefore, training and education of staff, family, carers or indeed the patients themselves can ensure effective and well-tolerated delivery of enteral feeding (Best & Hitchings, 2010). This training should start as soon as a patient is commenced on enteral tube feeding, so that a specialist team can support those caring for the devices to deal with the problems that may occur. Providing a written guide to managing enteral tube feeding in the community is essential as outlined by Best & Hitchings (2010). This should include care of the feeding tube and site, administration of feed, how to flush the feeding tube and with what, how to administer the medications, the use of feeding pumps if applicable and general troubleshooting including accessing ancillaries. These key points should always reflect local policy and have been assessed and ratified by individual organisation's governance arrangements.

Algorithm of nutrition and hydration in enteral tube feeding-





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